

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Currently Amended) A method for measuring mass from a change in oscillation frequency of a mass-measuring piezoelectric vibrating reed, the method comprising:

oscillating the piezoelectric vibrating reed with an oscillator circuit;

generating an output signal from the oscillator circuit that indicates an oscillating frequency of the vibrating reed;

dividing the output signal with a frequency divider to decrease a frequency of the output signal;

inputting the output signal from the oscillator circuit and an output signal from a voltage-controlled oscillator to a phase comparator of a phase lock loop circuit; and

determining the oscillation frequency of the piezoelectric vibrating reed based on an output of a loop filter in the phase lock loop circuit.

2. (Currently Amended) A measurement-signal output circuit for outputting a signal for detecting an oscillation frequency of an oscillator circuit which oscillates a mass-measuring piezoelectric vibrating reed, the measurement-signal output circuit comprising:

a piezoelectric vibrating reed;

an oscillator circuit that oscillates the vibrating reed and outputs a signal indicative of the oscillating frequency of the vibrating reed;

a frequency divider that lowers a frequency of the signal;

a voltage-controlled oscillator oscillatable at an oscillation frequency of the piezoelectric vibrating reed;

a phase detector which obtains the difference in phase between an output signal from the voltage-controlled oscillator and the output signal from the oscillator circuit; and

a loop filter having an output end connected to the voltage-controlled oscillator and an output terminal and outputting a voltage according to the difference in phase obtained by the phase detector.

3. (Previously Presented) The measurement-signal output circuit according to claim 2, wherein the piezoelectric vibrating reed has a sensitive membrane on an exciting electrode on one surface thereof that is in contact with liquid.

4. (Previously Presented) The measurement-signal output circuit according to claim 2, wherein the piezoelectric vibrating reed has a sensitive membrane on an exciting electrode on at least one of two surfaces thereof that is in contact with air.

5-7. (Cancelled)

8. (New) The method of claim 1 further comprising dividing the output signal from the voltage-controlled oscillator with a second frequency divider.

9. (New) The method of claim 1 further comprising determining a mass of a liquid based on the oscillation frequency.

10. (New) The measurement-signal output circuit according to claim 2 further comprising a second frequency divider that lowers a frequency of the output signal from the voltage-controlled oscillator.

11. (New) The measurement-signal output circuit according to claim 2 wherein the oscillation frequency is indicative of a mass of a liquid.